

MINING STUDENTS' PERFORMANCE IN UPSR USING STATISTICS AND NEURAL NETWORKS

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**UNIVERSITI UTARA MALAYSIA
2008**

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2008
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2008

MINING STUDENT'S PERFORMANCE IN UPSR USING STATISTICS AND NEURAL NETWORKS

A thesis submitted to the Division of Applied Sciences, College of Arts and Sciences in partial fulfillment of the requirements for the degree Master of Science (Information and Communication Technology), Universiti Utara Malaysia.

by
Nor Fazida Abd Rahman

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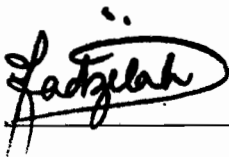
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ABSTRACT (BAHASA MELAYU)

Pencapaian pelajar di dalam peperiksaan menjadi penanda aras yang penting dalam menentukan kualiti pendidikan di Malaysia. Data-data peperiksaan telah dikumpul mulai ujian-ujian bulanan yang telah dijalankan sehingga ke percubaan UPSR untuk diuji dengan peperiksaan UPSR yang sebenar. Ini juga melibatkan data-data lain yang berkaitan seperti latar belakang keluarga dan maklumat berkenaan persekolahan pelajar. Data mentah diproses serta dianalisa menggunakan kaedah Statistik. Kaedah Statistik memberikan analisis yang bernilai kepada model pencapaian. Kemudian, kombinasi unit input, unit tersembunyi dan unit output diuji untuk meramal pencapaian sebenar pelajar. 5 model diuji berdasarkan 5 matapelajaran teras untuk mengaitkannya dengan faktor-faktor lain menggunakan analisis diskriptif. Justeru, hubungan itu dikaji dengan teliti untuk mengukuhkan model jangkaan. Model akhir kes ini menggunakan kadar pembelajaran 0.1, kadar momentum 0.1, fungsi aktivasi Sigmoid, kriteria penghentian pembelajaran 100 pusingan dengan senibinanya 13 unit input, 2 unit tersembunyi dan 5 unit output. Keputusan yang telah diperolehi menunjukkan Rangkaian Neural mempunyai potensi yang tinggi untuk meramal pencapaian pelajar di masa hadapan.

ABSTRACT (ENGLISH)

Academic performance has become an important evidence of determining the quality in Malaysia's education system. The examination data is collected on the previous students' examinations yet to be tested for their coming UPSR. The other related data such as family background and schooling information are also involved. The raw data is preprocessed and analyzed using statistical method. The results from the statistical analysis indicate the significant contribution of these attributes to the achievement model. The combinations of input variables, hidden layer and output nodes are explored to predict the students' performance. Five models are constructed based on five subjects to relate them with other factors for the purpose of descriptive analysis. The relationship between examination results and other factors are investigated thoroughly to enhance the prediction model. The performance model obtained in this study uses parameters such as; learning rate 0.1, momentum rate 0.1, Sigmoid activation function, 100 epoch learning stopping criteria with its architecture, 13 inputs unit, 2 hidden units and 5 output units. The result indicates that Neural Networks has high potential to be used in predicting students' performance.

ACKNOWLEDGMENT

A million of thanks are due first to my supervisor, Associate Professor Fadzilah Siraj for patiently navigating and generously sharing her rich source of knowledge with me. A good teacher always guides her students in no matter situation they are.

Equally thankful to my family for all the love and support by giving me a beautiful place in their heart. Fortunately born in teachers' family, education is the top priority to me. In a process towards seeking for excellent and meaningful education, knowledge brings its own values. Heartfull of thanks also flow to my sister, Ihwana As'ad for her loving and caring towards me.

A warm thanks to my colleagues; SK Tan Sri Ghazali Jawi, SK Basia Lama, SK Sri Adika Raja and SK Mahkota Sari, Gerik, Perak for allowing me to use their schooling dataset as experimental tool. These research findings are specially dedicated for the sake of my sacred 'children'.

I would like to express my eternal gratitude to my dearest partner, Mohd Shukri Mohd Adam for his kindness and for everlasting bond of fellowship. Not least, my deep appreciation goes to all who lend a hand in realizing this project.

Nor Fazida Abd Rahman

Division of Applied Sciences

College of Arts and Sciences

2008

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LIST OF ABBREVIATIONS

| | |
|----------------|---------------------------------------|
| AI | Artificial Intelligence |
| ANN | Artificial Neural Networks |
| BI | Bahasa Inggeris |
| BM1 | Bahasa Melayu 1 |
| BM2 | Bahasa Melayu 2 |
| BP | Backpropagation Algorithm |
| FF | Feed Forward Algorithm |
| MLP | Multilayer Perceptrons |
| MT | Mathematics |
| NC | Neural Connection |
| NN | Neural Networks |
| SAPR 16 | Sistem Analisis Peperiksaan |
| SC | Science |
| SK | Sekolah Kebangsaan |
| SMM | Sistem Maklumat Murid |
| PKSR | Penilaian Kemajuan Berasaskan Sekolah |
| UPSR | Ujian Penilaian Sekolah Rendah |

CHAPTER 1

INTRODUCTION

This section discusses the background of the study that consists of general overview on the education system in Malaysia, some brief description on the problem statements, objectives, scope and significance of this study. Finally, this section presents the thesis organization describing the structure of this report.

1.1 Overview

Realizing the importance of having a national database that comprises of graduate data, the Ministry of Higher Institutions of Learning has taken an initiative to form such a data warehouse. At the school level, 'Sistem Maklumat Murid' (SMM) is used for several years to collect information on students' background. SMM consists mainly information about demographic and co-curricular but not including their academic results. To support SMM, 'Analisis Peperiksaan 16' (SAPR 16) is used for the purpose of analyzing the students' results and ranks their performance accordingly. Even then, the analysis involves the use of descriptive approach of data mining technique. Little attempt has been made to include the use of forecasting model in managing the students'

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